Claims:

1. A method of diagnosing the presence of an estrogen responsive cancer in a patient, said method comprising the step of

measuring ERK8 levels in the cells of a biological sample obtained from said patient; and

determining if the ERK8 levels of the biological sample are significantly lower than those detected in non-cancerous cells, wherein significantly lower ERK8 levels indicates the presence of cancer cells in said patient.

2. The method of claim 1 wherein a decrease of greater than 20% in the ERK8 levels of the biological sample relative to the non-cancer cell levels indicates the presence of cancer cells in said patient.

3. The method of claim 2 wherein the estrogen responsive cancer to be diagnosed is selected from the group consisting of breast, ovarian and endometrial cancers.

4. The method of claim 3 wherein the estrogen responsive cancer to be diagnosed is breast cancer.

5. The method of claim 1 wherein the ERK8 level measured is the concentration of the ERK8 protein.

6. The method of claim 1 wherein the ERK8 level measured is the ERK8 kinase activity.

7. A method for diagnosing and determining the prognosis of a cancer patient, said method comprising the step of

determining ERK8 levels in a biopsy sample, wherein the severity of the decrease in ERK8 levels is correlated with more advanced stages of the cancer.

8. The method of claim 7 further comprising the step of determining estrogen receptor alpha (ER α) levels in the biopsy sample, wherein increased estrogen receptor alpha (ER α) levels (relative to healthy population levels) in combination with below normal ERK8 levels indicates a more advanced stage of cancer.

9. An antibody that specifically binds to the amino acid sequence of SEQ ID NO: 1.

10. The antibody of claim 9 wherein the antibody is labeled.

11. The antibody of claim 10, wherein the antibody is a monoclonal antibody.

12. The antibody of claim 11 wherein the antibody is releasably bound to a solid support.

13. A device for measuring ERK7/8 levels, said device comprising

a base provided with a capillary space, said capillary space having an interior surface and a first and second end;

a first port formed on an exterior surface of said base and in fluid communication with the first end of said capillary space;

a second port formed on an exterior surface of said base and in fluid communication with the second end of capillary space;

a reaction zone and a detection zone each formed on said interior surface of the capillary space, wherein said reaction zone comprises a labeled ERK7/8 antibody and the detection zone is located more proximal to the second port than the reaction zone, wherein fluid introduced into said first port will travel through the capillary space, contacting the reaction zone and then the detection zone as the fluid moves to the second port.

14. The device of claim 13 wherein said detection zone comprises a secondary antibody specific for said ERK7/8 antibody.

15. A method of monitoring the effectiveness of an anti-cancer agent for treating estrogen responsive cancers, said method comprising the steps of monitoring ERK8 levels in estrogen responsive cancer cells contacted with said agent.

16. The method of claim 15 wherein the cancer cells are contacted *in vitro* as a means of identifying new anti-cancer agents.

17. The method of claim 16 wherein the cancer cells are selected from various established tumor cell lines.

18. The method of claim 15 wherein the cancer cells are recovered from a patient and treated *in vitro*.

19. A method for identifying modulators of ERK7/8 activity, said method comprising the steps of

contacting an ERK7/8 polypeptide with a kinase substrate, and ATP, to form a control mixture;

contacting an ERK7/8 polypeptide with a kinase substrate, ATP, and a potential ERK7/8 activity modulator, to form a reaction mixture;

incubating the control and reaction mixtures under identical conditions for a predetermined length of time; and

comparing the amount of phosphorylated substrate produced in the reaction mixture to that produced in the control mixture, wherein a different concentrations of phosphorylated substrate produced by the control and reaction mixtures identifies a ERK7/8 activity modulator.

20. The method of claim 19 wherein the kinase substrate is a polypeptide comprising the sequence of SEQ ID NO: 6.